

## CLAIMS:

1. An electric power steering system including a torque control system for generating a steering assist torque based on a detected steering torque,

the system further comprising a filter portion for improving a phase characteristic or a gain characteristic of the torque control system,

wherein the filter portion is constituted as a multiple-step filter including a first filter having a transfer function  $G_1(s)$  for suppressing resonance and a second filter having a transfer function  $G_2(s)$ ,

wherein the transfer function  $G_1(s)$  is represented by the following expression (1-1),

$$G_1(s) = (s^2 + 2\zeta_{11}\omega_1 + \omega_1^2) / (s^2 + 2\zeta_{12}\omega_1 + \omega_1^2) \dots (1-1),$$

where  $s$ : a Laplace operator,  $\zeta_{11}$ : a damping coefficient,  $\zeta_{12}$ : a damping coefficient, and  $\omega_1$ : an angular frequency,

wherein the transfer function  $G_2(s)$  is represented by the following expression (2-1),

$$G_2(s) = (s^2 + 2\zeta_{21}\omega_2 + \omega_2^2) / (s^2 + 2\zeta_{22}\omega_2 + \omega_2^2) \dots (2-1),$$

where  $s$ : a Laplace operator,  $\zeta_{21}$ : a damping coefficient,  $\zeta_{22}$ : a damping coefficient, and  $\omega_2$ : an angular frequency, and

wherein the damping coefficients  $\zeta_{21}$ ,  $\zeta_{22}$  satisfy the following expression (2-2),

$$\zeta_{21} \geq \zeta_{22} \geq 1 \dots (2-2).$$

2. An electric power steering system according to Claim 1, wherein the angular frequencies  $\omega_1$ ,  $\omega_2$  satisfy the following

expression (3),

$$\omega_1 = \omega_2 \dots (3).$$

3. An electric power steering system according to Claim 1, wherein the angular frequencies  $\omega_1$ ,  $\omega_2$  satisfy the following expression (4),

$$\omega_1 \neq \omega_2 \dots (4).$$